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ABSTRACT

Will there be sufficient numbers of trained people to take care of the nation's health needs? As a partial response to this question, the American Council on Education (ACE) recently completed a study on the entering freshman classes at a national sample of higher education institutions. This summary presents some of the highlights of the study. The first section describes what has been happening in the health fields: their growing popularity as a group, relative to other study fields; gains and losses in specific health fields and their relation to trends in the demography of college students; and the impact of changing enrollment patterns on shifts in particular health fields. In the second section, health aspirants are compared with nonhealth aspirants, and trends in the characteristics of health aspirants over a 6-year period are identified. The third section focuses on health majors, with particular reference to patterns associated with stability in, recruitment to, and defection from a major in the health fields; in addition, some of the factors related to stability of choice are isolated and evaluated. The final sections take a close look at aspirants to specific health careers, particularly at those who planned to become physicians.
(Author/PG)

EXECUTIVE SUMMARY

TRENDS AND CAREER CHANGES IN THE HEALTH FIELDS: A COMPARISON WITH OTHER DISCIPLINES

SUBMITTED TO

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Improved medical care, the provision of some kind of insurance coverage for everyone, and federal support for training in the health fields are current issues of vital national concern. Concomitant with these concerns is the perennial question: Will there be sufficient numbers of trained people to take care of the nation's health needs? Since World War II, certain health fields have suffered chronic shortages, which some experts predict will continue through the 1970s. More information is needed about the potential supply in relation to demand.

As a partial response to this need, the American Council on Education (ACE) recently completed a three-phase study for the Bureau of Health Resources Development, Health Resources Administration, of the Department of Health, Education, and Welfare. Data were drawn from ACE's Cooperative Institutional Research Program, which annually since 1966 has surveyed the entire entering freshman classes at a national sample of higher education institutions and has followed up, at subsequent intervals, smaller subsamples of the same students.

The first phase of the study was based on approximately 1.3 million first-time, full-time freshmen in 1967 who were followed up four years later, in 1971. The health aspirants comprised all those who, on the freshman questionnaire, said that they planned to major in one of the following fields: biology, biochemistry, biophysics, botany, zoology, other biological sciences, health technology (medical, dental, laboratory), nursing, pharmacy, predentistry, premedicine, preveterinary medicine, and therapy (occupational, physical, speech). Comparisons were made between this group and nonhealth aspirants, defined as those 1967 freshmen who named some other field as their probable major, plus the 5 percent who were undecided as to major field or who gave no response. In addition, health majors (all those who, on the 1971 followup survey, reported that they had actually majored in a health field) were compared with nonhealth majors (all those who, in 1971, reported that they had majored in some other field). Finally, some of the factors related to stability of choice (of a major in a health field) were

identified and evaluated.

In the second phase of the study, the entering freshman classes of four different years--1966, 1968, 1970, and 1972--were examined (a) to assess similarities and differences between health aspirants (a group that ranged from 190,304 freshmen in 1966 to 300,172 freshmen in 1972) and nonhealth aspirants[1] for each year under investigation and (b) to detect changes over the six-year period in the institutional distribution and the characteristics of health aspirants. In addition, analyses were carried out by sex and by race (black and nonblack).

The third and final phase of the study used a five-year longitudinal data base of 1966 freshmen, followed up first in 1970 (four years after college entry) and again in 1971 (five years after college entry). This phase differed from the first two in that it focused on career choice rather than study field major. A total of 89,547 respondents to the 1970 followup survey named as their probable career one of the following: dentist, dietician or home economist, lab technician or hygienist, nurse, optometrist, pharmacist, physician, therapist, veterinarian. The characteristics of these health-career aspirants were examined. In addition, those respondents to the 1971 followup who indicated that they planned to become physicians were described in detail. Within the physician-aspirant group, recruits (those who had named another career choice in 1970) were compared with stables (those who had named physician as their career choice both in 1970 and in 1971) and those who planned to go into family practice were compared with those interested in other specialties.

The remainder of this summary presents some of the high spots of the findings

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[1]The total group of nonhealth aspirants ranged from 1,245,989 in 1966 to 1,341,100 in 1972. For purposes of our analyses, however, only a 10 percent random sample of nonhealth aspirants for each year was used in the comparisons.

from this study.[2] The first section describes what has been happening in the health fields themselves: their growing popularity as a group, relative to other study fields; gains and losses in specific health fields and their relation to trends in the demography of college students; and the impact of changing enrollment patterns on shifts in particular health fields. In the second section, health aspirants are compared with nonhealth aspirants, and trends in the characteristics of health aspirants over a six-year period are identified. The third section focuses on health majors, with particular reference to patterns associated with stability in, recruitment to, and defection from a major in the health fields; in addition, some of the factors related to stability of choice are isolated and evaluated. The final sections take a close look at aspirants to specific health careers, particularly at those who planned to become physicians.

The Overall Picture

Perhaps the most notable finding to emerge from the study is that the health fields became suddenly more popular in 1972. In 1966, 1968, and 1970, they attracted a steady 12 or 13 percent of entering freshmen; then in 1972, the figure jumped to 18.3 percent--an increase of 58 percent in the absolute number of entering freshmen naming a health field as their probable major. A cursory

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[2]For more detailed information, interested readers are referred to the technical reports:

Engin I. Holmstrom, "Trends and Career Changes of Students in the Health Fields: A Comparison with Other Disciplines--Phase I Technical Report" (Washington: Policy Analysis Service, American Council on Education, 1973).

Engin I. Holmstrom & Nancy Cohen, "Trends and Career Changes of Students in the Health Fields: A Comparison with Other Disciplines--Phase II Technical Report" (Washington: Policy Analysis Service, American Council on Education, 1974).

Engin I. Holmstrom, "Trends and Career Changes of Students in the Health Fields: A Comparison with Other Disciplines--Phase III Technical Report" (Washington: Policy Analysis Service, American Council on Education, 1974).

look at data from the 1973 freshman survey suggests that this sharp increase may represent the beginning of a trend. Moreover, the rise in the popularity of the health fields is paralleled by a similar rise in the popularity of other preprofessional and paraprofessional college majors, reflecting a burgeoning interest in vocational and career training and an intensifying emphasis on the "practical" as opposed to the "academic." In short, the attitudes and expectations of students entering colleges and universities in the 1970s contrast markedly with those of their counterparts in the 1960s.

The economic recession and the tight job market are often cited as factors contributing to the new orientation toward job-related postsecondary education. Another important, though less widely recognized factor is the changing demographic structure of the undergraduate student population: The rapid development of the junior college system, coupled with the emergence of the national goal of equal educational opportunity, has worked to bring larger proportions of blacks and of women into higher education, and both these groups appear to be highly attracted to paraprofessional and professional health fields.

Gains and Losses in Specific Health Fields

The increased representation of blacks and of women in the college population may partly explain changes in the popularity of specific health fields. In the six years covered by the study (1966-72), the following shifts in the distribution of aspirants among the different health fields occurred:

1. Majors in fields leading to paraprofessional careers (i.e., therapy and health technology) gained considerably in popularity, particularly among blacks. Moreover, the number of men planning to major in these dominantly "feminine" fields increased substantially. Similarly, the number of men planning to go into nursing--also considered a "woman's profession"--

registered a startling increase of 236 percent; the increase in the number of blacks who named nursing as their probable major was 294 percent.

2. Of the three major study fields leading most directly to careers in the health professions--predentistry, premedicine, and preveterinary medicine--only the first showed a decline in the number of students attracted, and this decline occurred only among men and nonblacks. Preveterinary medicine registered an overall increase of 38 percent in the absolute number of freshmen naming these fields as their probable major. Though still a small minority of students planning careers in the health professions, substantially more women and more blacks were choosing these fields in 1972 than in 1966.
3. Generally, both the numbers and the proportions of freshmen planning to major in the academic health disciplines of biology, biochemistry, biophysics, and zoology declined between 1966 and 1972. On the other hand, the category of "other biological sciences" registered increases, as did botany (except among black health aspirants).

Effects of Changing Enrollment Patterns

As was pointed out above, changes in enrollment patterns--expecially the unprecedented expansion of enrollment in public two-year colleges over the past 20 years--may help to explain shifts in the popularity of specific health fields. In 1966, one out of four freshman health aspirants initially enrolled in a two-year college. Though the proportion of nonhealth aspirants enrolling in two-year colleges increased at a similar rate, the enrollment patterns of the two groups differed in that, among health aspirants, the major decrease occurred in

university enrollments, whereas among nonhealth aspirants, enrollments in both four-year colleges and universities dropped. The decline in university enrollments may in part account for the relatively slow growth rate of premedicine, a major field that is generally offered only at universities. The increased enrollments in two-year colleges may also account for the greater popularity of the paraprofessions, though these fields were also popular among four-year college entrants.

Who Plans to Major in the Health Fields

This section focuses on those students who, when they entered college as freshmen, indicated that they planned to major in a health field. We will look first at how these health aspirants compared with nonhealth aspirants (i.e., students who, as freshmen, indicated that they would probably major in a nonhealth field) and then at how the characteristics of health aspirants among entering freshman classes changed over the six years covered by the study.

Health Aspirants vs. Nonhealth Aspirants

A comparison of health aspirants and nonhealth aspirants in the five freshman classes under investigation (1966, 1967, 1968, 1969, and 1970) shows that the two groups were much alike in their demographic characteristics, except that the proportion of women in the health-aspirant group was equal to the proportion of men, whereas men outnumbered women in the nonhealth-aspirant group. The modal entering freshman in each group was 18 years old, white and Protestant; came from a middle-income family (annual income of $10,000-$14,999); and had parents who were high school graduates. (About two-fifths of the students in both groups had parents with at least some college education.)

Among men, health aspirants were substantially more likely than were nonhealth aspirants to come from families with annual incomes of $15,000 or more and to have college-educated parents. (Twice as many had fathers who had earned an advanced degree.) In addition, from 4 percent to 6 percent of the male health

aspirants, but only 1 percent of the male nonhealth aspirants, had fathers who were physicians. Male health aspirants also tended to be superior in academic achievement, as measured by both high school and college grades, and were more likely than were male nonhealth aspirants to receive the baccalaureate within four years after college entry. These socioeconomic and academic differences between men in the two groups were almost entirely attributable to the large proportions of male health aspirants who planned to become health professionals (i.e., dentists, physicians, veterinarians). That is, students aiming for health professional degrees tended to come from more affluent and educated families and to have better academic records than did other male health aspirants.

Among women, nonhealth aspirants were slightly more likely to come from high-income backgrounds, but there were no differences between the two groups with respect to parents' education. Female health aspirants were superior in academic ability to their male counterparts and about equal to female nonhealth aspirants. They were less likely, however, to attain the baccalaureate within four years after college entry, probably because of the large proportion who were interested in nursing and health technology--occupations where employment is possible without the bachelor's degree.

As would be expected, the two groups differed considerably in their goals and expectations, though some goals were common to both: for instance, developing a meaningful philosophy of life, having a stable and secure future, working with people rather than with things, becoming an authority of a special subject, and being a success in one's own business. Health aspirants were more service and science-oriented: They placed a high value on helping others, being useful to society, and making a contribution to science; they were more likely to see themselves working in a hospital or clinical setting, engaged primarily

in serving patients and doing research. Nonhealth aspirants, on the other hand, gave greater emphasis to artistic goals (e.g., becoming accomplished in a performing art, writing original works) and "materialistic" goals (being very well-off financially, becoming an expert in finance and commerce). They also placed a higher value on having administrative responsibility over others. They were more likely to expect to be employed in an educational institution or a business firm, engaged primarily in teaching or in administration.

Finally, health aspirants were more likely to enroll, as freshmen, in universities and in large and selective institutions than were nonhealth aspirants.

Trends in the Characteristics of Health Aspirants

The only significant change with respect to the demographic and background characteristics of successive groups of health aspirants between 1966 and 1972 was in sex distribution and racial composition. In 1966, men outnumbered women (52 percent versus 48 percent), but by 1972 the balance had shifted in favor of women, who comprised 56 percent of the health-aspirant group. (Among nonhealth aspirants, the proportion of women remained fairly constant at about 42 percent.) The proportion of blacks in both groups rose from 5 percent in 1966 to 8 percent in 1972. The number of black women in the health-aspirant group increased by a startling 192 percent between 1966 and 1972, as compared with an increase of only 59 percent in the number of black male health aspirants. (Among black nonhealth aspirants, the increase in absolute numbers was about the same for both sexes: approximately 90 percent.)

During the period covered by the study, entering freshman classes grew more liberal in their attitudes toward a variety of social and campus issues: That is, students entering college in 1972 were more likely than were earlier freshmen to take antiauthoritarian positions. This trend was universal and failed to differentiate between health aspirants and nonhealth aspirants.

Blacks in both groups, however, were generally less liberal in their attitudes than were nonblacks.

Despite the changes in sex composition and racial distribution already noted, no notable shifts were observed with respect to life goals or career expectations.

Who Actually Majors in the Health Fields

In 1967, 13 percent of the entire entering freshman class stated that they would probably major in a health field; by 1971, only 9 percent had actually done so. They are referred to as health majors. To look at it another way: Seven out of ten students who, in 1971, reported majoring in a health field had been a health aspirant as a freshman; these are the stables. Another three in ten of the health majors planned, as freshmen, to major in a nonhealth field (or was undecided or gave no response) but ended up majoring in a health field; these are the recruits. And about one in three men and one in four women who initially planned to major in a health field failed to do so; these are the defectors. In this section, we will look at the patterns of change in relation to health fields and at factors contributing to stability of choice.

Patterns of Change

An examination of the specific health fields shows that premedicine, predentistry, and preveterinary medicine (all majors leading most directly to a health professional degree) suffered the greatest losses between 1967 and 1971, possibly because many institutions do not offer such majors, forcing aspirants to major instead in one of the biological or physical sciences. (Note that losses from these preprofessional majors do not necessarily imply a decrease in numbers planning to get a health professional degree or planning to become physicians, dentists, or veterinarians.) Biochemistry and biophysics also incurred fairly heavy losses. Indeed, the only health field that registered increases in

absolute numbers of students were zoology, biology, and botany.

As has been pointed out, defection from an initial choice of a health field major was more common among men than women. Defectors came from slightly higher socioeconomic backgrounds than did stables or recruits in that a larger proportion reported that annual parental income was $20,000 or more and that their fathers had at least some college education. Students who had matriculated at highly selective institutions were more likely to defect. Defection from a health field was clearly related to poor academic performance: The overall college grade-point averages of defectors were lower than those of recruits and stables, and defectors were more likely to report having failed one or more courses. Close to half the defectors shifted to a major in the social sciences (with education, psychology, and sociology being their main choices), and about one in five to the arts and humanities. Despite their relatively poor academic records in college, defectors were more likely to complete the baccalaureate within four years after college entry.

Recruitment into a health field from a freshman choice of a nonhealth major was slightly higher among women than among men; but within the recruit group, men outnumbered women (55 percent vs. 45 percent). Students were more likely to be recruited into the health fields if they had matriculated at public institutions or at two-year colleges. They were more likely than were either stables or defectors to have transferred or dropped out temporarily between 1967 and 1971. Perhaps partly as a result of delays occasioned by transferring or dropping out, they were less likely to get the baccalaureate within four years after college entry. The biological sciences and therapy (occupation, physical, speech) were the most successful of the health fields in attracting recruits.

Over half the stables had majored in biological sciences, and one-fifth had majored in nursing. Students were more likely to maintain their initial

choice of a health field major if they had matriculated at a university. In addition, a higher proportion of stables than of recruits or defectors made B+ or better grade averages in high school and B or better grade averages in college.

Some of the differences among the three groups--differences that may help explain these patterns--are suggested by the relative priority that each gives to certain life goals and to reasons for choosing a particular career. Thus, stables were more likely to rank as essential or very important the goal of making a theoretical contribution to science; they were also more likely to cite as reasons for their career choice the chance to contribute to society and the availability of job openings. Recruits were more likely to value artistic accomplishment (in the performing arts and music) and to cite avoidance of a high-pressure job and a stable and secure future as goals. Defectors gave relatively high priority to the goals of having administrative responsibility over others, becoming an expert in finance and commerce, being very well-off financially, keeping up-to-date with political affairs, writing original works, having opportunities to be creative and original, and working with people rather than with things; they were more likely to cite as reasons for their career choice opportunities for rapid advancement and for freedom of action.

Other Factors Related to Stability

Women and older students were more likely than were men and younger students to carry through with their freshman plans to major in a health field. Freshman degree aspirations were also related to stability: Students initially aspiring to health professional degrees (M.D., D.D.S., D.V.M.) were more likely to maintain their choice of a major in a health field, whereas those who, as freshmen, planned on a master's or a bachelor's degree were more likely to defect to non-health fields. In addition, those whose fathers were physicians were more likely to be stables. Certain sources of college finance (namely, "other" outside

sources, teaching assistantships, federal or state scholarships, and parental support) were associated with stability. Students from Catholic backgrounds were more likely to be stables, and those from Jewish backgrounds more likely to be defectors.

Because the college majors and careers that constitute the health fields are a heterogeneous lot (from biophysics through predentistry to dietetics and lab technology) and because the groups of students lumped together, for purposes of the study, as health aspirants and health majors are widely divergent (ranging from men who plan to become physicians to women who plan to become speech therapists), it seems very likely that our analyses failed to include all the possible relevant student characteristics and behaviors that may help to account for such outcomes as stability in or defection from a health field. Similarly, certain significant features of higher education institutions were probably not covered. For instance, we may safely surmise that majoring in a particular field is closely related to the availability of particular courses and fields of study. Further, and more subtly, the dominant vocational interests and major field choices of other students at a college or university may affect the individual's choice. Two-year colleges, for example, are particularly likely to emphasize vocational curricula such as nursing and the health paraprofessions; it is not surprising, then, that women who enter two-year colleges (for whatever reasons) are attracted into these fields. Majors in predentistry, premedicine, and preveterinary medicine are more likely to be offered at large research universities than at small colleges; it follows, then, that students who enroll in universities will be more likely to major in these preprofessional health fields than will students who enroll in small colleges.

In confirmation of this hypothesis, analyses run separately on aspirants to a health professional degree showed that these students were more likely than

than were nonaspirants to attend private institutions, highly selective institutions, and universities. In addition, as was mentioned earlier, aspirants to an H. P. degree were more likely to be male, to have highly educated parents, and to come from affluent homes. Further, their academic ability was high, and they were more likely to receive the degree within four years after college entry.

Profiles of Health-Career Aspirants

In 1970, four years after college entry, about 6 percent of all 1966 first-time, full-time freshmen named a health field as their career choice. Of the 89,547 health-career aspirants, 32 percent planned to become nurses, 21 percent physicians, 15 percent therapists, 11 percent lab technicians, 8 percent dentists, 5 percent dieticians, 5 percent pharmacists, 3 percent veterinarians, and 1 percent optometrists.

Looking at the total group, we find that women outnumbered men three to two. Nine out of ten health-career aspirants were white, with blacks constituting the largest minority group (6 percent). Over half the health-career aspirants were Protestant, 30 percent were Roman Catholic, 7 percent were Jews, and 6 percent were raised in other religions. The modal health-career aspirant was 18 years old at matriculation, with only 7 percent 20 years of age or above. The median parental income level was $9,618, with 30 percent coming from families with less than $8,000 annual income and 22 percent from families with $15,000 or more annual income.

Health-career aspirants had, on the whole, a positive self-image, tending to give themselves high ratings on their understanding of others, academic ability, drive to achieve, cheerfulness, and intellectual self-confidence. On the other hand, fewer than one in four felt they were above average in artistic and mechanical ability or in political conservatism. Their belief in their abilities is, to some extent, justified by their baccalaureate completion rates

and their college grade-point averages: 53 percent completed the bachelor's degree within four years after college entry, and 60 percent made B or better averages.

Certain values and attitudes were common to all groups of health-career aspirants. Like their counterparts in nonhealth fields, they emphasized the goals of becoming an authority in a special subject in their field and keeping up-to-date with political affairs. Eight out of ten health-career aspirants said that helping others in difficulty was important to them and that they were attracted to their career choice because it offered opportunities to be helpful to others and to work with people. Over one-third gave high priority to obtaining recognition from their colleagues for contributions to the field and being successful in their own business. They were more inclined than was the average college student to aim at making a theoretical contribution to science but less inclined to emphasize artistic achievements. Other major reasons cited by health-career aspirants for their choice were the chance to contribute to society, intrinsic interest, and the availability of job openings. About two in five were interested in high earnings. Relatively few mentioned rapid career advancement and freedom from pressure as factors influencing their choice.

The overall picture that emerges, then, is of a group of academically able and self-confident people with an orientation toward serving others. Nonetheless, there were some striking differences among the groups, particularly with respect to life goals and self-ratings. In the rest of this section, we will profile the five most popular health-career groups, comparing each to the total group of health-career aspirants. (The numbers choosing the other four careers were too small to permit generalization.) For simplicity's sake, those in the group are usually referred to by occupational title (e.g., "dentists" rather than "dentist aspirants" or "persons planning to become dentists"); the reader should

bear in mind, however, that inclusion in the group is based upon career plans as reported four years after college entry.

Dentists (7,091 aspirants)

Dentistry was a male-dominated field, with only 2.5 percent women. It attracted relatively large numbers of Orientals and of German-speaking students. Dentists tended to come from fairly affluent families (median parental income $10,766) and to enter large (enrollment over 10,000) public universities located in the West-Southwest.

Judging by his self-ratings, the typical dentist had a very high regard for himself, particularly of his drive to achieve and mechanical ability. In addition, dentists tended to give themselves high ratings on academic ability, athletic ability, artistic ability, mathematical ability, originality, popularity, popularity with the opposite sex, and intellectual self-confidence. Despite this positive self-image, the college performance of dentists, as measured by grades, was no more than average. Further, only about half the dentists received the baccalaureate in four years, as compared with four-fifths of the physicians. Only 36 percent had actually majored in predentistry; two-fifths majored in biological sciences, mostly in general biology and zoology.

Relative to other health-career aspirants, dentists gave high priority to the goals of being successful in their own business, being very well-off financially, and keeping up-to-date with political affairs; they gave relatively low priority to helping others in difficulty. Consistent with this emphasis on materialistic as opposed to altruistic goals, dentists cited high earnings as their primary reason for choosing dentistry as a career; relatively few mentioned the opportunity to help others and to make an important contribution to society. The prestige of the profession and the autonomy it offered were other important factors influencing their career choice.

By 1971 (five years after college entry), 72 percent of the dentists were enrolled in graduate or medical school most of these having completed at least one year of advanced training. Federal loans were a source of support to 12 percent of the dentists enrolled in advanced training (as compared with only 3 percent of the total group of health-career aspirants in advanced training). Relatively large proportions were financing their advanced training through support from parents or other relatives and through withdrawals from savings. Only one in ten had any kind of fellowship, scholarship, or other grant (as compared with one in four of the total group), and relatively few cited employment as a major source of support.

About half the dentists expected to be self-employed when they started practice, 16 percent saw themselves involved in a small group practice, and another 16 percent in a professional school.

Lab Technicians (9,604 aspirants)

The modal aspirant to a career in lab technology was a white female (fewer than one in four were male) from a rather low-income family (median parental income $9,202). The field attracted larger proportions of Italian-speaking students and Roman Catholics than any other health career; in addition, the proportion of Orientals was fairly high.

Lab technicians were likely to enroll as freshmen in relatively unselective public institutions located in the Midwest or West-Southwest and in four-year colleges rather than in universities.

Except on the rather dubious qualities of sensitivity to criticism, stubbornness, defensiveness, and political conservatism, lab technicians were consistently more likely than were other health-career aspirants to rate themselves as no more than average. The were particularly apt to give themselves low ratings on leadership, drive to achieve, popularity, and public speaking ability.

Three in four indicated that helping others in difficulty was an important life goal. Lab technicians also valued making a theoretical contribution to science, obtaining recognition from their colleagues, and writing original works but had little interest in being successful in their own business, keeping up-to-date with political affairs, or becoming community leaders.

The college grades of lab technicians averaged B or above (as was true for the total group of health-career aspirants), and about half received the baccalaureate within four years after college entry.

Health technology was the most common major (49 percent), followed by biological sciences (33 percent). In 1971, close to nine out of ten were employed, most of them full time. About one in four said they were housewives. Only 5 percent were taking advanced training, and most of these relied on commercial loans or on earnings from employment for support. About one-third of the lab technicians said that, though they were not enrolled at the time of the 1971 followup, they planned to enroll for advanced training at some time in the future.

As reasons for choosing their career, lab technicians tended to cite the availability of jobs, high earnings, the chance for steady progress, the chance for career advancement, and the prestige of the occupation. Relatively few named leadership opportunities, the chance for originality, or autonomy. Over two in five expected to be working in a hospital or clinic, and another 14 percent in a medical group practice. Seven out of ten lab technicians saw service to patients as a major job activity; teaching, research, and administration were also named by sizable proportions.

Nurses (28,430 aspirants)

Nursing is still predominantly a woman's field, with 94 percent being female, usually white and of Protestant background, though sizable proportions of blacks, Roman Catholics, and Polish-speaking people were also attracted. Nurses were more

likely to be older than average in that 14 percent were over 21 at matriculation. Like lab technicians, they came from middle and lower socioeconomic levels (median parental income $9,301).

Nurses were more likely than were other health-career aspirants to have initially enrolled in two-year colleges and in medium-sized public institutions of low selectivity located in the Midwest.

The average nurse was very modest in her self-ratings, particularly on mathematical and mechanical ability, academic ability, intellectual self-confidence, originality, popularity, and drive to achieve. Nonetheless, nurses were more likely than were aspirants in the other groups to rate themselves high on cheerfulness, and over three in four gave themselves superior ratings on understanding of others.

The goal of having administrative responsibility for the work of others was highly valued by most nurses, whereas the goals of making a theoretical contribution to science and becoming a community leader were given low priority.

The academic performance of nurses, as measured by college grades, was average. Their baccalaureate completion rate was rather low (one in three, four years after college entry), partly perhaps because of a tendency to drop out temporarily during the college years and partly because of enrollment in hospital diploma programs (about 9 percent of the group reported receiving some "other" degree by 1970).

Four in five nurses were employed at the time of the 1971 followup, most of them full time. About one in five was enrolled in school, but most of these were still undergraduates. One-third reported they were housewives. Though only 7 percent were enrolled in graduate or medical school one-third planned to enroll for advanced training at some time in the future. Those taking advanced training supported themselves principally through federal scholarships and fellow-

ships, earnings from employment, and commercial loans.

Relatively large proportions of nurses cited leadership opportunities and the availability of jobs as reasons for their career choice. Other common reasons were being able to work with people, having the opportunity to be helpful to others, the chance for steady progress, and making a contribution to society.

Most nurses expected to work in a hospital or clinic providing services to others. Other major job activities were teaching, administrative duties, and counseling.

Physicians (18,741 aspirants)

The modal physician was a white Protestant male (only 11 percent of the group were women), 18 years old at matriculation, from an affluent background (median parental income $12,180--higher than that of any other health-career aspirant group). Relatively large proportions of Orientals and Jews also planned to be physicians.

Physicians were more likely than were other health-career aspirants to enroll as freshmen at private institutions. In addition, they tended to enter large, selective universities, most frequently located in the Northeast.

Being successful in his own business, making a theoretical contribution to science, becoming a community leader, helping others, and becoming an authority in his field were goals given high priority by the physician. He was less inclined than those in most other health-career groups to place value on having administrative responsibility or being very well-off financially.

The typical physician radiated self-confidence, being inclined to rate himself high on a variety of socially desirable attributes ranging from academic ability to originality. Much of this self-confidence seemed justified in that a larger proportion of physicians than of any other group of health-career aspirants made outstanding grades in college (overall average of B+ or better).

Moreover, four out of five in this group had received the baccalaureate within four years after college entry. Only 15 percent majored in premedicine. Half majored in biological sciences, and one-fifth in physical sciences. In addition, 9 percent majored in social sciences (usually psychology), and 5 percent in arts and humanities (usually English).

By 1971, over two-thirds of the physician aspirants were in medical school, most of them supported by their parents. Slightly over one in five had scholarship or fellowship support. One in three stated that, in the absence of adequate finances, they would be willing to take sizable loans to continue in medical school. Of the relatively few who were employed (30 percent), most were working part time.

Relatively large proportions chose medicine as a career because of the autonomy it provides and because of their intrinsic interest in the field. Prestige and the chance to make an important contribution to society were other reasons frequently cited, whereas availability of jobs and high earnings were mentioned relatively rarely. One in three physicians expected to work in a small group medical practice, one in four to be self-employed, and one in ten to be working in a hospital or clinic. The major work activity was expected to be service to clients, though many thought they would also spend much of their time in counseling, teaching, and research.

Therapist (Occupational, Physical, Speech) (13,784 aspirants)

Women predominated in this field; only 13 percent of the aspirants were male. Although the modal therapist was white and Protestant, therapy attracted the largest proportion of blacks of any health-career group: 12 percent. Like lab technicians and nurses, therapists came from rather low income backgrounds (median parental income, $9,205). They were likely to enroll as freshmen in public two-year and four-year colleges of medium size (enrollment 2,500-9,999)

located in the Southeast.

Relative to other health-career aspirants, therapists placed a high value on artistic goals, particularly by achievement in the visual arts (painting, sculpture), the performing arts, and creative writing. They were also more likely than any other group to cite helping people in difficulty as an important or essential goal. Winning recognition from colleagues for contributions in their special field was also important to them. On the other hand, therapists had little interest in being successful in a business of their own or having administrative responsibility over others.

Consistent with this picture of a rather artistically inclined and "other-oriented" person, the typical therapist rated herself high on artistic ability, public speaking ability, popularity (including popularity with the opposite sex), social self-confidence, and understanding of others. She gave herself low ratings on mathematical and mechanical ability.

In academic achievement, therapists ranked second of the health-aspirant groups, after physicians; almost two-thirds made college grade-point averages of B or better. Their baccalaureate completion rates were relatively high: Over three-fifths received the degree within four years after college entry. This record is particularly impressive when one considers that therapists had higher transfer rates than any other health-aspirant group and that transferring in the college years often leads to delays in degree completion. Seven in ten indicated an undergraduate major in therapy.

In 1971, almost three in four therapists were employed, most of them on a full-time basis. One-fifth were enrolled in graduate school, and close to half of this group had scholarships or fellowships, usually from the federal government. Other major sources of support for advanced training were earnings from employment and withdrawals from savings; relatively few received parental support.

The reasons given by therapists for their career choice are consonant with their life goals and self-ratings: They were much more likely than were other health-career aspirants to cite opportunities for originality, for working with people and ideas, and for helping others that therapy provides. Relatively few mentioned leadership opportunities, high earnings, or prestige.

One in three therapists saw themselves employed in hospitals and clinics; close to 30 percent planned to work in educational institutions, especially at the elementary and secondary level. Serving patients and clients was the major job activity envisioned by therapists, though a large proportion also planned to do counseling.

Family Practitioners vs. Other Specialists

Five years after college entry, 20,374 respondents to the 1971 followup survey named physician as their career choice. This represents a gain in absolute numbers of 8.7 percent in the one-year interval between the two follow-ups of 1966 freshmen. Of this group of 1971 physician aspirants, over one-third (7,270) planned to go into family practice; the remainder were interested in other specialties. This final section compares these two groups, who are referred to, for convenience, as family practitioners and other specialists.

The proportion of men was higher among family practitioners (93 percent) than among other specialists (84 percent). Although the modal student in both groups was white, Protestant, and 18 years old at matriculation, other specialties attracted larger proportions of Orientals and of Roman Catholics and Jews than did family practice. In addition, family practitioners tended to come from more affluent backgrounds (median parental income $12,421) than did other specialists (median parental income $11,992). Family practitioners were more likely to enroll as freshmen in public four-year colleges of small size and medium selectivity located in the Southeast. Those interested in other specialties tended

to enroll initially at selective private universities in the West-Southwest.

The two groups differed somewhat in their life goals and self-ratings. Though four out of five students in both groups gave high priority to helping others in difficulty, other specialists were inclined to rank as important or essential a greater number of goals; moreover, their goals were more instrumental: being an authority in their special field, being very well-off financially, receiving recognition from colleagues, having administrative responsibility. In contrast, family practitioners gave high priority to expressive goals such as participating in an organization like Vista or the Peace Corps, becoming a community leader, keeping up-to-date politically.

Similarly, larger proportions of other specialists gave themselves high ratings on a number of traits, including academic ability, mathematical ability, mechanical ability, public speaking ability, sensitivity to criticism, and understanding of others. On only a few traits--athletic ability, originality, intellectual and social self-confidence--were family practitioners more inclined to rate themselves as above average. The high self-regard of other specialists was to some extend justified by their academic records: Close to half got B+ or better overall grade-point averages in college, compared with 40 percent of the family practitioners. Equal proportions (three in four) of each group completed the baccalaureate within four years after college entry.

In 1971, three in five out of each group were enrolled in medical school. Close to one in four of the family practitioners had scholarship or fellowship support, compared with only 17 percent of the other specialists. Family practitioners were more likely to take federal loans, and other specialists to receive support from spouses or parents.

Other specialists were inclined to cite a greater number of reasons for their career choice, in particular job availability, high earnings, rapid advance-

ment, and prestige. The opportunity for originality and ability to work with ideas were also mentioned by more of those interested in other specialties.

One in four students in each group planned to be self-employed. Over half of the family practitioners, but only three in five of the other specialists, said they would probably work in a small medical practice. Larger proportions of other specialists than of family practitioners planned to work in hospitals and clinics or in professional schools. Other specialists were also more likely to be undecided about their preferred long-term employer. Nine in ten aspirants in both groups expected to spend most of their time in service to patients and clients; counseling was also seen as a major activity. Other specialists were more likely than were family practitioners to plan on doing research.

Conclusion

The analysis carried out in the course of this three-phase study make it clear that such factors as demographic attributes, socioeconomic background, academic ability, self-image, and values influence such outcomes as one's probable major, actual major, career choice, and choice of specialty within a career. For instance, health aspirants and nonhealth aspirants are much alike with respect to background characteristics except that male health aspirants are more likely than are male nonhealth aspirants to come from affluent backgrounds, to have college-educated parents, and to have fathers who are physicians. The two groups differ, however, in their life goals, with health aspirants emphasizing service and science goals and nonhealth majors emphasizing materialistic goals. Looking at the patterns related to actual major, we find that stables in health fields were more likely, as freshmen, to aspire to a degree in one of the health professions; moreover, their high school and college grades tended to be high. Recruits to the health fields were likely to be transfer students. Defectors from the health fields generally made rather poor academic records. Moreover,

aspirants to particular health careers have distinctive qualities. For instance, those who, four years after matriculation, plan to become physicians and dentists come from more affluent backgrounds, are academically superior, and think highly of themselves. Lab technicians and nurses tend to come from poorer socioeconomic backgrounds and to have a low self-regard, particularly of their intellectual and academic qualities.

It is also clear that institutional characteristics play an influential role in the student's choices. Although our analyses focused only on the institution of matriculation (and it should be borne in mind that about one in four students transfers during the college years), and although we used only crude measures of institutional characteristics, definite patterns emerged. For instance, matriculation at a two-year college is associated with recruitment into the health fields and with a probable career in nursing; matriculation at a four-year college is associated with defection from the health fields and with the career choices of therapist and lab technician (as well as with an interest in family practice, on the part of physicians); and matriculation at a university is associated with stability of choice of a health field major and with the career choices of physician and dentist (as well as with an interest in other specialties, on the part of physicians). These relationships can be explained, at least in part, by (a) the availability of, and emphasis given to, particular majors in certain kinds of institutions, and (b) pressures from the peer group and others in the college environment. To return to the questions raised at the very beginning: It would seem that the manpower outlook in the health fields is bright. In recent years, there has been an impressive increase in the absolute numbers of students naming a health field as their probable major. The health fields that have grown particularly in popularity are "other" biological sciences, therapy, health technology, preveterinary medicine, nursing, botany, pharmacy, and premedicine.

In a way, the health fields epitomize many of the recent trends apparent throughout postsecondary education. Thus, the proportions of blacks and of women have increased during the past several years, perhaps as a result of the new emphasis on equal opportunity and affirmative action. The sex stereotyping of various occupations seems gradually to be breaking down. Finally, the growing popularity of nursing and of the paraprofessions and the declining interest (or slow growth rates) in some of the academic health fields reflect burgeoning student interest in career-related education.